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Technology Center:	2672
Serial Number:	09/526,442
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August 13, 2003

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	AHMED, Kamran	
Serial No.:	09/526,442	
Filing date:	March 16, 2000	
Title:	VIDEO DISPLAY SYSTEM WITH TWO CONTROLLERS EACH ABLE TO SCALE AND BLEND RGB AND YUV SURFACES	
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APPEAL BRIEF

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Sir:

The Notice of Appeal in the above-captioned U.S. patent application was filed on May 13, 2003. A one-month extension of time for filing this Appeal Brief

is hereby requested. The large entity fees for the extension of time and for the filing of the present Appeal Brief prescribed by 37 C.F.R. 1.17(c) may be charged to Deposit Account 19-5113.

The real party of interest in this Appeal is the Assignee, Matrox Graphics, of Montreal, Quebec, Canada.

This Appeal is not related to any other appeals or interferences.

1. STATUS OF CLAIMS

Claims 1 to 7 are pending in this application. All claims have been finally rejected. Claim 1 has been finally rejected under 103(a) and 112(1). Claims 2 to 7 have been finally rejected under 112(1). No claim has been allowed, and all of the claims are under Appeal.

2. STATUS OF AMENDMENTS

A proposed amendment submitted after final rejection has not been entered. The Examiner maintains the amendment raises the issue of new matter. The proposed amendment is included herewith in Appendix E.

3. SUMMARY OF THE INVENTION

The present invention relates to a single controller system for multiple display output. A method is taught for controlling a single graphic controller system with a single memory subsystem having at least two display outputs, in which control of surface selection, conversion, combination, scaling and output is afforded. "Surface" is a term of art meaning an image or its corresponding video memory space.

Video display controllers are known which are able to work with both RGB format images and YUV format images (usually reserved for motion pictures or a video source) to combine two video surfaces from graphics memory to provide an overlay output. This is useful, for example, in the situation that a movie source in YUV format is obtained by decoding a video file from say a CD-ROM or DVD device, and written to a surface in graphics memory. At the same time a computer environment desktop is stored in RGB format in another surface within graphics memory. These two surfaces can be combined to provide the YUV source within a window on the desktop. Because the video display controller handles the conversion, scaling and mixing of the two sources, the computer operating system or application program does not directly create the desired display, but rather instructs the display controller system to scale and combine the two sources as desired. The quality of display and efficiency of the computer system is thereby greatly enhanced. In such displays controller systems, only one combined output of mixed format video is possible in which case the second output can only mirror what is being displayed by the first output. Furthermore, since only two surfaces (one RGB and one YUV) are being read, one for each of only one RGB pixel path and only one YUV pixel path, the degree of flexibility is further limited.

One of the main applications of the invention is where the second display can show a video image full screen while the main display maintains a separate image such as a fully interactive Windows desktop. The video from the second display can also be replicated on the first display within a window. Another application is for adding logos, subtitles etc. Note in the case of DVDs (as an example) where the language of the subtitles is user selectable, the sub-titles are not embedded in the source of the YUV surface but are overlaid in real-time from a user selectable source.

The first step of the method of the invention is to provide a first display controller able to read from a graphics memory at least two first surfaces into at least two pixel paths, convert at least one of the at least two first surfaces, scale at least one of the at least two first surfaces, and combine (blend and/or overlay) the at least two first surfaces, the first surfaces containing any one of RGB and YUV format video. A second display controller capable of performing the same operations on at least two second surfaces is also provided. The first display controller is caused to select and read the first surfaces, convert the first surfaces into a like first format at least when the first surfaces are not all in the like first format, scale at least one of the first surfaces, combine the first surfaces to obtain a combined first surface, and output the combined first surface to provide a first output stream of pixel data. The second display controller is also caused to perform the same operations on the second surfaces and output a combined second surface to provide a second output stream of pixel data. Flexibility is provided by selection of the first and second surfaces as well as scaling and blending of the first and second surfaces, whether the surfaces are in RGB format, YUV format or mixed RGB/YUV format.

4. ISSUES

There are three issues outstanding in this application.

The first issue is whether the specification, as originally filed, supports blending and overlaying of two surfaces in compliance with the requirements of 35USC§112.

The second issue is related to issue (1) and concerns whether the amendment at page 8 line 18, filed on May 13, 2003 under 37 CFR 1.116 in reply to the final rejection but not entered, constitutes new subject matter in violation of 35USC§132. More specifically, the issu is whether figure 4 properly shows the

actions of blending and overlaying as would be understood by the descriptive text added at page 8, line 18 in the amendments filed on December 3, 2002 and on May 13, 2003. Figure 4 was not part of the drawings as originally filed, however, it corresponds to Figure 4 from Applicants' corresponding application serial number 09/526,440, that was incorporated by reference in the present application.

The third issue is whether the claims are unpatentable under 35USC§103(a) in view of Ranganathan (US Patent 5,764,201). More specifically, the issue is whether the additional logic suggested by Ranganathan at column 7, lines 63 to 65 suggests performing the method steps defined in Applicants' claim 1, including providing two graphics controllers each able to read two separate surfaces.

5. GROUPING OF CLAIMS

Claim 1 is the only independent claim and claims 2 to 7 are all dependent claims directly dependent on claim 1. The claims under Appeal are directed to one invention with the dependent claims specifying more specific limitations. For the purposes of simplifying the Appeal, all claims should be taken as one group.

6. ARGUMENT

First Issue

To qualify issue (1), the claims as originally filed had the term "combine (blend and/or overlay)". The Examiner stated that the term was indefinite and rejected the claims under 112(2) for failing to describe how to blend and overlay and thus, failing to clearly claim the invention.

The Applicant believes the original term of "combine (blend and/or overlay)" used in original claim 1 and in the specification at page 2, line 19 to be

understood by a person skilled in the art reading the whole specification so as to provide a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention. The Applicant respectfully submits that the Examiner incorrectly asserts that the Applicant did not describe how to blend and overlay.

Blending is a common term in the art and is to be understood as a merging of two images where a pixel-based mixing of the images takes place, in which pixels are output that have blended values from the two images. Figure 3, shown in Appendix C, of the specification shows an output with sub-picture blending, wherein a first and a second surface have been blended together. Element 18 is identified as being a blending unit or graphical overlay unit in CRTC. Figure 2, shown in Appendix B, is described in the specification as originally filed as

> "a schematic block diagram of a controller reading two surfaces of any of a plurality of video formats, carrying out conversion, if necessary, and scaling and combining (overlaying and/or blending) in accordance with the preferred embodiment"

More specifically, figure 2 includes a blending unit within the controller, which corresponds to element 18 as identified in figure 3. The specification as originally filed includes the following description at page 6, lines 11 to 16:

> "One of the main applications of the invention is where the second display can show a video image full screen while the main display maintains a separate image such as a fully interactive Windows desktop. The video from the second display can also be replicated on the first display within a window. For the video on both displays to have sub-picture blending, **both controllers must hav sub-picture blending units**." (emphasis added)

Therefore, both CRTC1 and CRTC2 have a unit within that can perform blending of a first and a second surface together.

Overlaying is also a common term in the art and is to be understood as laying one surface on top of another, wherein one surface is in the foreground and one surface is in the background, in which pixels output are selected from either one surface or the other. The two surfaces are not merged or mixed. An example of this is for a window on a computer screen displaying a first image, wherein the window is overlaid onto the desktop of the computer, as is taught by Ranganathan in Figure 3. When the window is scaled to a smaller size than the actual screen size, the desktop can be seen in the background in the area not covered by the window.

Essentially, overlaying is a special case of blending. It is known in the art of computer graphics that when blending, alpha factors are set to determine the degree of blending. To overlay, 0% and 100% are selectively set as alpha factors to determine whether a pixel will be covered by the pixel of a first image or cover the pixel of the other image, respectively. It is known in the art to use blending units to perform overlaying, instead of using pixel multiplexers. Therefore, it is clear from the description that the blending unit 18 from figures 2 and 3 can be used to either blend or overlay at least two surfaces read by either of the two controllers (11 or 12).

Additionally, the specification describes how the drawing engine, as seen at reference numeral 60 in figure 1, can perform blending. In application 09/526,440 incorporated by reference in the originally filed application, it is stated at page 7, lines 13-14 that:

> "A 3D drawing engine, in accordance with the invention, can also be used for scaling, overlaying or blending purposes of 2D motion video images."

And at page 8, lines 21 to 24 of the same application incorporated by reference:

> "the YUV surface is processed by the drawing engine 60 in order to blend using the 3D drawing engine capability within the display controller apparatus to create a blended YUV surface. This blended surface is like the one which could also be achieved using a blending unit 15"

The person skilled in the art understands from the specification as filed that "combining" means performing blending and/or overlaying, and that this is to be don by each controller. It is readily apparent from Figure 2 and the specification as filed that each controller has a blending unit and no additional overlaying or blending unit to perform both blending and overlaying. However, it is understood that "within the display controller apparatus" there is the capability to call upon the drawing engine 60 to perform a blending operation on two surfaces. It follows in a straightforward manner from the specification as filed that the operation of blending and overlaying can be achieved by blending two surfaces using the drawing engine 60 to provided a blended surface, and then to use the blending unit 18 in the controller to blend or overlay the blended surface with another surface. Thus to a person skilled in the art, the specification teaches that each controller can blend and overlay at least two surfaces in compliance with 35USC§112(1).

According to §2163.07(b) of the MPEP relating to material incorporated by reference, the information incorporated is as much a part of the application as filed as if the text was repeated in the application, and should be treated as part of the text of the application as filed. Replacing the identified material incorporated by reference with the actual text is not new matter.

Claim 1 does not specify whether the two surfaces are blended before or after being read from memory. The claim recites the steps of:

> "causing said first display controller to select and read said first surfaces, convert said first surfaces into a like first format at least when said first surfaces are not all in said like first format, scaling at least one of said first surfaces, at least one of blending and overlaying said first surfaces to obtain a combined first surface, and outputting said combined first surface to provide a first output stream of pixel data"

From the specification, it can be understood that two surfaces are first blended together by the drawing engine, creating a blended surface within the memory. This blended surface is then read from memory and overlaid with another surface by the blending unit within the display controller. What is then output to the display by the controller is a blended surface overlaid onto another surface.

Therefore, the Applicants respectfully submit that a person of skill in the art of computer graphics would, when given the description and the drawings, know how to use the resources as presented to perform both blending and overlaying of at least two surfaces, and that the original specification does provide support for blending and overlaying.

Second Issue

To qualify issue (2), the amendment to page 8, line 18, was submitted to overcome the 112(2) rejection of the claims. In response to the 112(2) rejection described in issue (1), the Applicant changed the term to "at least one of blend and overlay" and imported figure 4 of application 09/526,440 incorporated by reference in the originally filed application. The Examiner then stated that the term "at least one of blend and overlay" was not supported by the originally filed specification since the specification did not describe the display controller as performing both blending and overlaying one surface onto another surface to create the screen image and rejected the claims under 112(1). The Applicant amended the specification at page 8, line 18 to include the t xt present in figure 4 to describe the blending and overlaying of one

surface onto another surface to create the screen image. This amendment has been rejected as raising the issue of new subject matter.

The Applicant respectfully submits that the output of CRTC1 11 of figure 4 includes a window containing YUV video with sub-picture blending overlaid over an RGB desktop. The Examiner argues that the RGB is part of a window, but that the figure does not describe an RGB desktop. The Examiner maintains that figure 4 does not teach the claimed display controller that performs blending and overlaying of two surfaces. Regardless of the outcome of the first issue, the Applicant respectfully submits that figure 4 does teach blending and overlaying.

Figure 4, as shown in Appendix E, is a schematic block diagram of an embodiment in which the 3D drawing engine is used to scale a DVD YUV surface and blend a graphic surface to create a YUV overlay surface for the first display. As described on page 8, lines 21 to 28 of the '440 application incorporated by reference:

> "In the embodiment of Figure 4, the YUV surface is processed by the drawing engine 60 in order to blend using the 3D drawing engine capability within the display controller apparatus to create a blended YUV surface. This blended surface is like the one which could also be achieved using a blending unit 15 as illustrated in Figure 3, namely the logo is blended with the source video surface to generate the YUV overlay surface which is then read for display by CRTC2 in full screen output 71 and separately read by CRTC1 for display within a window in the desktop."

From the language "for display within a window", it is to be understood that the blended surface is overlaid onto an RGB desktop surface by CRTC1. The figure illustrates this by showing a first display 70 with a scaled windowed output comprising a blended image of the logo and the conference meeting. This window is overlaid onto an RGB desktop, identified in the figure as "Other Windows or desktop etc" and pointing to the other smaller windows in the background.

As stated above for issue (1), §2163.07(b) of the MPEP relating to material incorporated by reference states that the information incorporated is as much a part of the application as filed as if the text was repeated in the application, and should be treated as part of the text of the application as filed. Therefore, the Applicant believes the above quoted text to form an integral part of the '442 application and respectfully submits that this fully supports the statement that Figure 4 describes both blending and overlaying of at least two surfaces. Furthermore, this also supports the statement "the output of CRTC1 11 includes a window containing a YUV video with sub-picture blending overlaid over the RGB desktop" inserted at the end of the paragraph at page 8, line 18.

It should be noted that the Examiner has not objected to importing figure 4 of the '440 application into the present application. The rejection was based on his views that the text added at page 8, line 18 constitutes new subject matter because the added figure and the incorporated by reference application do not teach the claimed display controller that performs blending and overlaying of two surfaces. The Applicants respectfully submit that this is an incorrect assertion and that there is sufficient description in the incorporated by reference application to adequately support the statement added to the present application in describing figure 4.

Third Issue

To qualify issue (3), the Examiner maintains that Ranganathan teaches a second display controller with the same features as the first display controller such that the CRT and the LCD can display different overlaid images. The Applicant respectfully submits that although Ranganathan suggests providing "additional logic" to provide a combination of a smaller movie window on a graphics background, there is no support for suggesting that the additional logic recited corresponds to an entire

path being duplicated. A path is a term used in the art to refer to circuitry that reads from memory, processes information, and sends it to a multiplexer that will select which pixel stream is to be sent to the actual display.

Ranganathan concerns a display control system connected to a portable computer and a CRT display. In this particular system, graphics pixels stored in memory are transmitted to either one of two paths according to their format; the first path is dedicated to RGB graphics pixels whereas the second one handles movie-overlay pixels in YUV format. The above-mentioned pixels are then channeled by two pixel multiplexers (muxes) to either one of two other paths; the first path drives the portable computer's LCD screen whereas the second path drives the CRT display. The dual display controller offers several modes of operation; the pixel muxes can be programmed to work in simultaneous, dual, or reverse dual mode. When operating in simultaneous mode, both pixel muxes switch to select movie pixels from the YUV path in order to display, on both output devices, a full screen of graphics pixels, a full screen of video pixels, or a graphics screen with a smaller window of movie pixels. As for the dual mode, the screens display two different images; the graphics pixels are displayed on the LCD panel while the movie pixels are displayed on the CRT screen. Finally, reverse dual mode is very similar to dual mode, except that graphics pixels are displayed on the CRT screen while movie pixels are displayed on the LCD panel

The dual-path graphics controller of Ranganathan cannot display a YUV format video in a window overlaid on a desktop on one output device, while displaying YUV format video in a window overlaid on a desktop on another output device. As mentioned, when the dual-path graphics controller is displaying two different images on the output screens, each screen is exclusively dedicated to a certain pixel format according to the operating dual mode. In other words, as stated

in U.S patent No. 5,764,201, column 7, lines 63-65, the "image cannot be a combination of a smaller movie window on a graphics background unless *additional logic* is added" (emphasis added). Ranganathan provides a dual-path graphics controller, both paths being coupled to a graphics memory for storing pixels for display. As shown in figure 8A of Ranganathan, the first path, identified as the YUV path, comprises a MVE FIFO, a scaler, and a color-space converter. The second path, identified as RGB path, comprises a CRT FIFO, an attributes controller, a multiplexer, and a RAM Look-up table. According to these technical resources, the "additional logic" required by the dual-path graphics controller is a second YUV path comprising a scaler unit. However, Ranganathan does not disclose nor suggest the addition of a second display controller within a display controller system wherein both controllers have the ability to read two surfaces, and blending and/or overlaying capability of both YUV and RGB surfaces.

Ranganathan also suggests, at column 12, lines 13 to 22, to provide multiple overlays within a single controller by the addition of additional logic or re-use of the existing logic. Likewise, such additional logic could be an additional YUV path so that a mux could overlay two YUV windows over the RGB graphics. Again, however, Ranganathan does not disclose nor suggest the addition of a second display controller within a display controller system wherein both controllers have blending and overlaying capability of both YUV and RGB surfaces.

The Examiner argues that the additional logic suggested by Ranganathan is a second RGB path next to YUV path 34 and a second YUV path next to RGB path 36 to allow a movie window on a graphics background to be equally available on both the LCD and the CRT. There is no support for suggesting that the additional logic recited by Ranganathan corresponds to the entire path being duplicated. The Applicant respectfully submits that, according to the resources

available in the Ranganathan system, the additional logic which is being referred to in column 7, lines 63-65 and is compatible with what is described in the rest of the specification by Ranganathan corresponds to the modified version of Figure 8A provided herewith (exhibit G). The modified figure illustrates what is suggested by Ranganathan in order to allow a first display to display overlaid, scaled, and converted first surfaces and a second display to display overlaid, scaled, and converted second surfaces. Any further modifications go beyond what is suggested by the reference. It is not necessary to duplicate the unit which reads from memory, in this case, the MVE FIFO 62, and outputs the movie pixels in order to allow a movie window on a graphics background to be equally available on both the LCD and the CRT. The simplest modification is to duplicate the scaler, color-space converter, and multiplexer which selects between the scaler output and the color-space converter output and is input into the already existing multiplexers to be sent to the display units. What is input into the duplicated scalar is the output of the MVE FIFO 62, the same data that is input into the original scalar in YUV path 34. Therefore, even with additional logic, Ranganathan does not teach or suggest having a second display controller with the same features of the first display controller such that the CRT and the LCD can display different overlaid images.

The Examiner argues that modified figure 8A is not totally correct because it shows the scaled movie to be overlaid on the graphics background as the same movie read by MVE FIFO 62. The Examiner states that this is not what Ranganathan teaches because he teaches a smaller movie overlaid onto the graphics background, he does not state the smaller movie is the same movie provided in path 34. While the Applicant agrees with the Examiner that Ranganathan does not clearly state that the smaller movie is the same movie provided in path 34, it would be completely beyond the scope of what is disclosed by Ranganathan to

assume otherwise. There is no suggestion by Ranganathan that another movie besides the one being overlaid onto the graphics background would be displayed on the second display. There is no reason to believe that any other movie would be read besides the one provided in path 34. The Applicant respectfully submits that a person of skill in the art would interpret Ranganathan in such a way and would be lead to the modified figure 8A if asked to produce the "additional logic" suggested by the reference.

It should be noted that the Examiner's rejection under 103(a) is based on the Ranganathan reference alone. The rejection does not involve additional references or any official notice and thus it is based on what is directly suggested by Ranganathan. The Applicants respectfully submit that what the Examiner is arguing Ranganathan suggests is not enabled by Ranganathan alone. Such an embodiment would require further knowledge or further teaching from an external document. Without reference to such an external document, the Applicants respectfully submit that a person of skill in the art would be led to the simple solution provided by the Applicant in Exhibit G and not to an embodiment consistent with the language of claim 1. The embodiment proposed by the Examiner would require guidance and would not readily be apparent to a person skilled in the art.

Therefore, the Applicant believes that the claimed invention is not obvious in view of Ranganathan and that claims 1 to 7 are therefore patentable.

Accordingly, a decision in favor of the acceptability of the claims under appeal is respectfully solicited.

Respectfully submitted,

Michel Belanger
Registration No. 38,015

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Enc.: Appendix A: Claims pending
Appendix B: Figure 1
Appendix C: Figure 2
Appendix D: Figure 3
Appendix E: Figure 4
Appendix F: proposed amendment
Appendix G: Modified Figure 8A of Ranganathan

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office on the date shown below.

Michel Belanger

Name of person signing certification

Signature

August 13, 2003
Date

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APPENDIX A

CLAIMS UNDER APPEAL IN 09/526,442

1. A method of providing a display output for at least two display devices using a single graphic controller system, the method comprising:

providing a first display controller able to read from a graphics memory at least two first surfaces into at least two pixel paths, convert at least one of the at least two first surfaces, scale at least one of the at least two first surfaces, and at least one of blend and overlay the at least two first surfaces, said first surfaces containing any one of RGB and YUV format video ;

providing a second display controller able to read from a graphics memory at least two second surfaces into at least two pixel paths, convert at least one of the at least two second surfaces, scale at least one of the at least two second surfaces, and at least one of blend and overlay the at least two second surfaces, said second surfaces containing any one of RGB and YUV format video;

causing said first display controller to select and read said first surfaces, convert said first surfaces into a like first format at least when said first surfaces are not all in said like first format, scaling at least one of said first surfaces, at least one of blending and overlaying said first surfaces to obtain a combined first surface, and outputting said combined first surface to provide a first output stream of pixel data;

causing said second display controller to select and read said second surfaces, convert said second surfaces into a like second format at least when said second surfaces are not in said like second format, scaling at least one of said second surfaces, at least one of blending and overlaying said second surfaces to obtain a combined second surface, and outputting said combined second surface to provide a second output stream of pixel data,

whereby flexibility is provided by selection of said first and second surfaces as well as scaling and blending of said first and second surfaces, whether said surfaces are in RGB format, YUV format or mixed RGB/YUV format.

APPENDIX A

2. The method as claimed in claim 1, wherein the first output stream and the second output stream are fed into a first multiplexer and a second multiplexer, an output of the first multiplexer being fed into a first display, and an output of the second multiplexer being fed into a second display, the method further comprising causing said multiplexers to select a desired one of said output streams for display on said first and second displays.

3. The method as claimed in claim 1, wherein:

said first display controller reads two first surfaces, has at least one controllable color space converters outputting a selected one of RGB and YUV format video, and one scaling units scaling an output of said said at least one color space converters and another scaling unit independently scaling the unconverted surface, and a combining unit receiving an output of said two scaling units,

the method comprising causing said two scaling units to scale each of *said two first surfaces.*

4. The method as claimed in claim 1, wherein:

said first display controller reads two first surfaces, has at least one controllable color space converters outputting a selected one of RGB and YUV format video, and one combining unit combining an output of said at least one color space converters and another surface, and a scaling unit receiving an output of said combining unit,

the method comprising causing said scaling unit to scale said combined surfaces.

5. The method as claimed in claim 1, wherein:

said second controller reads two second surfaces, has at least one controllable color space converters outputting a selected one of RGB and YUV format video, and one scaling units scaling an output of said at least one color space converters and another scaling unit independently scaling the un

APPENDIX A

converted surface, and a combining unit receiving an output of said two scaling units,

the method comprising causing said two scaling units to scale each of said two second surfaces.

6. The method as claimed in claim 1, wherein:

said second display controller reads two second surfaces, has at least one controllable color space converters outputting a selected one of RGB and YUV format video, and one combining unit combining an output of said at least one color space converter and another surface, and a scaling unit receiving an output of said combining unit,

the method comprising causing said scaling unit to scale said combined surfaces.

7. The method as claimed in claim 1, wherein:

said single graphic controller system comprises a drawing engine scaler responsive to a scaling command to pre-scale at least one surface in said graphics memory and output a scaled version in a scaled surface in said graphics memory; and

one of said steps of causing said first display controller and causing said second display controller comprises one of scaling said at least one of said first and second surfaces, respectively, using said drawing engine scaler and reading said at least one of said first and second surfaces, respectively, from said scaled surface wherein at least one of said first and second controllers does not have at least one of said backend scalers.

APPENDIX B

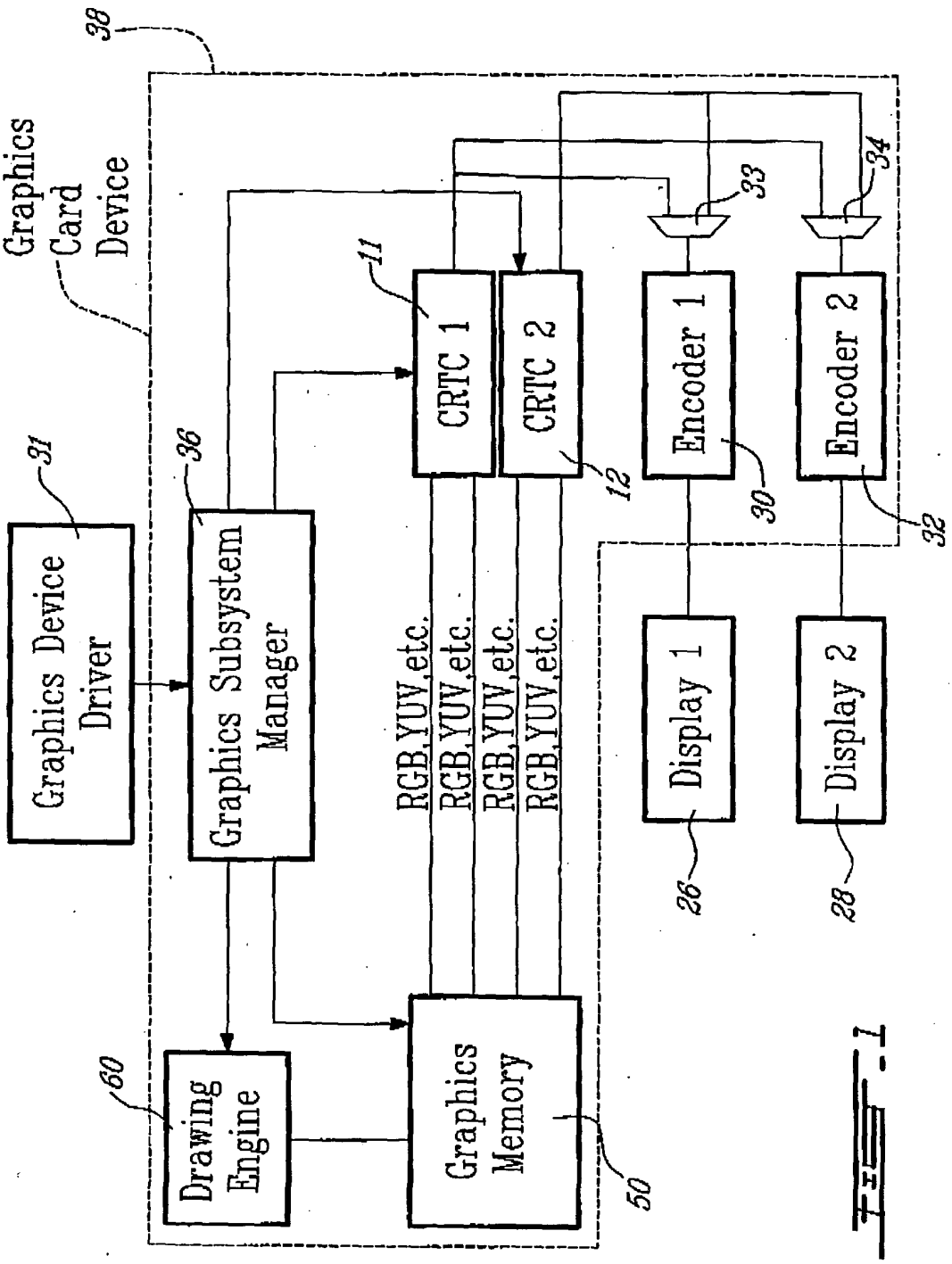
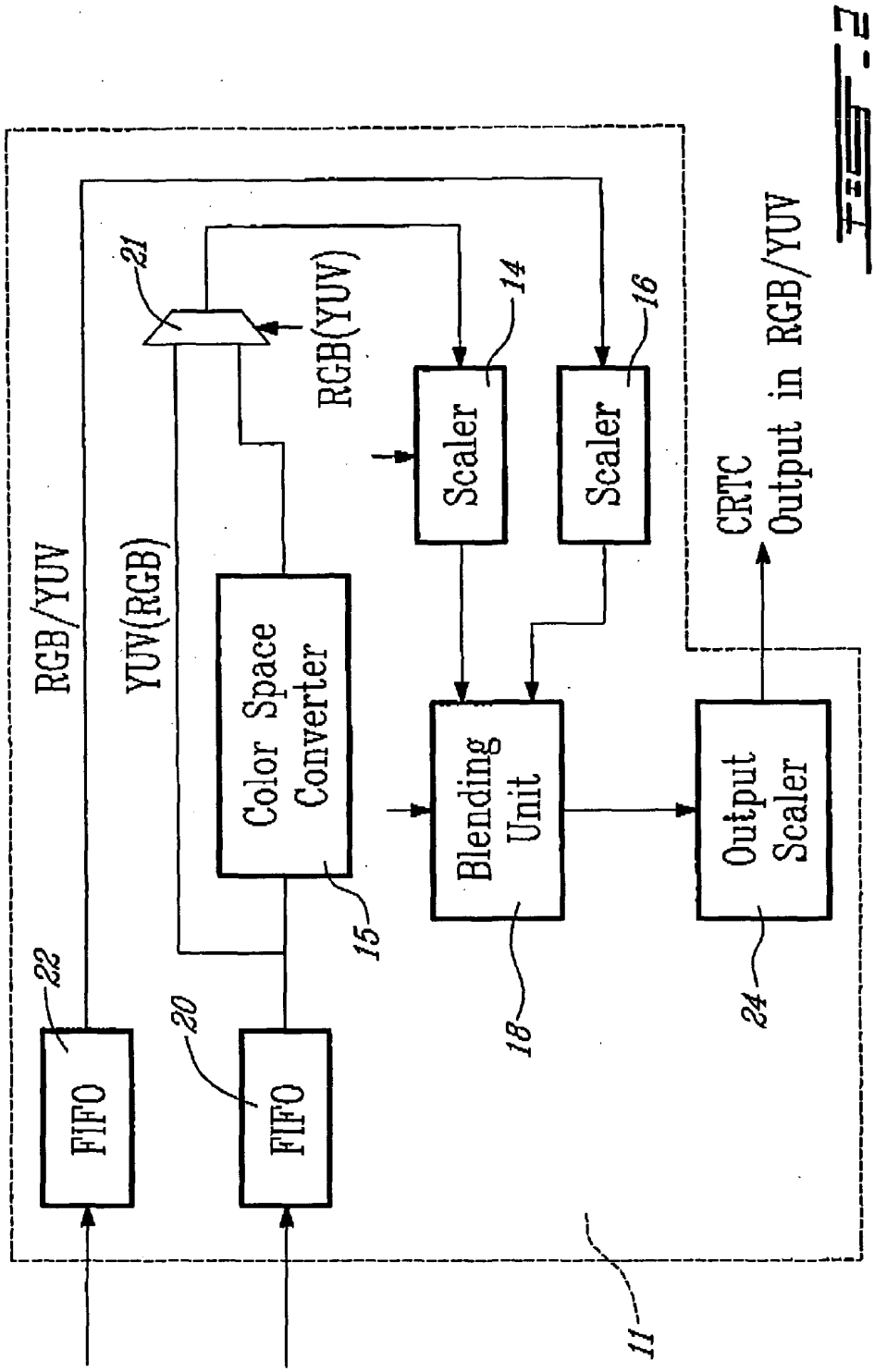


Fig. 1

APPENDIX C



APPENDIX D

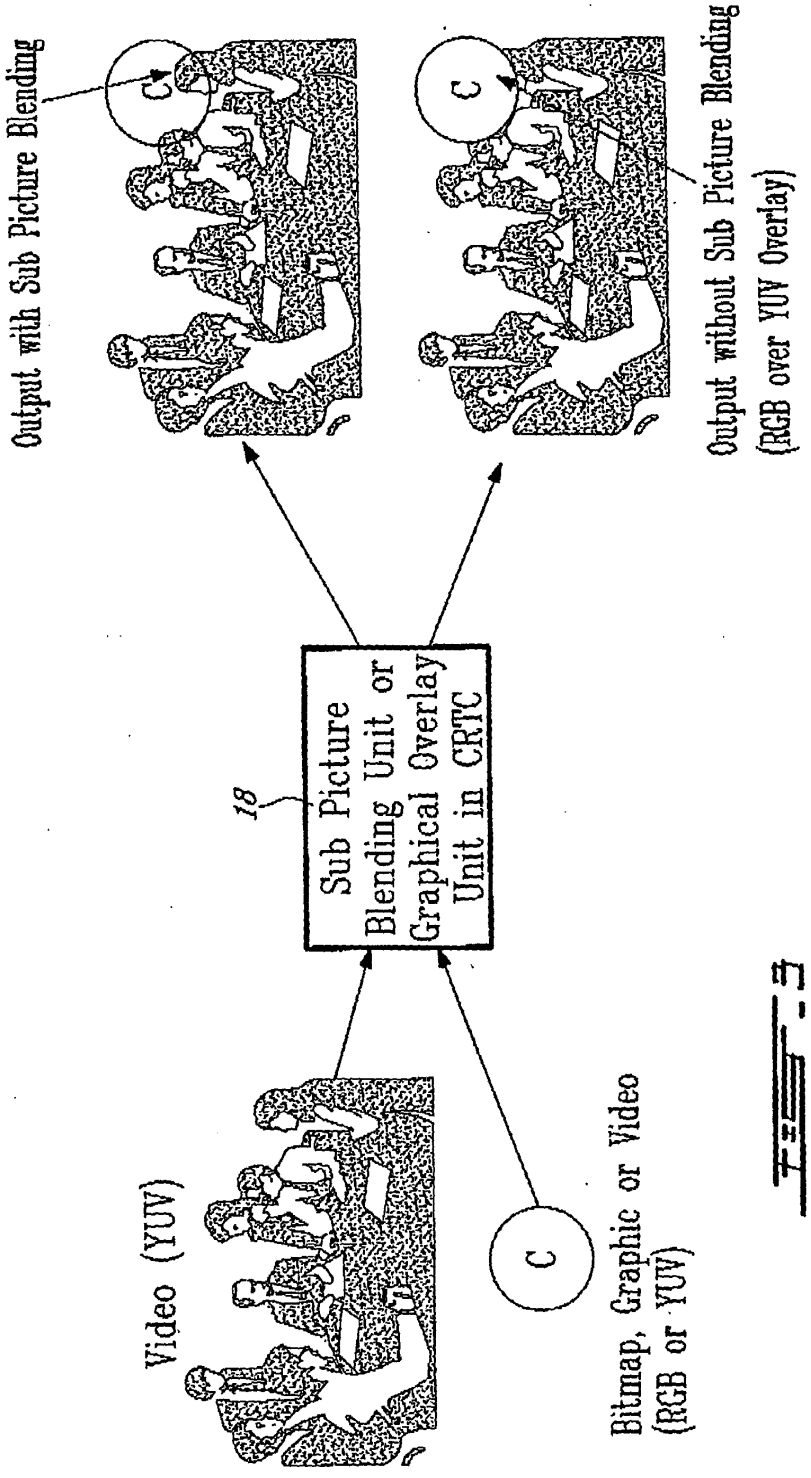


Fig. 3

APPENDIX E

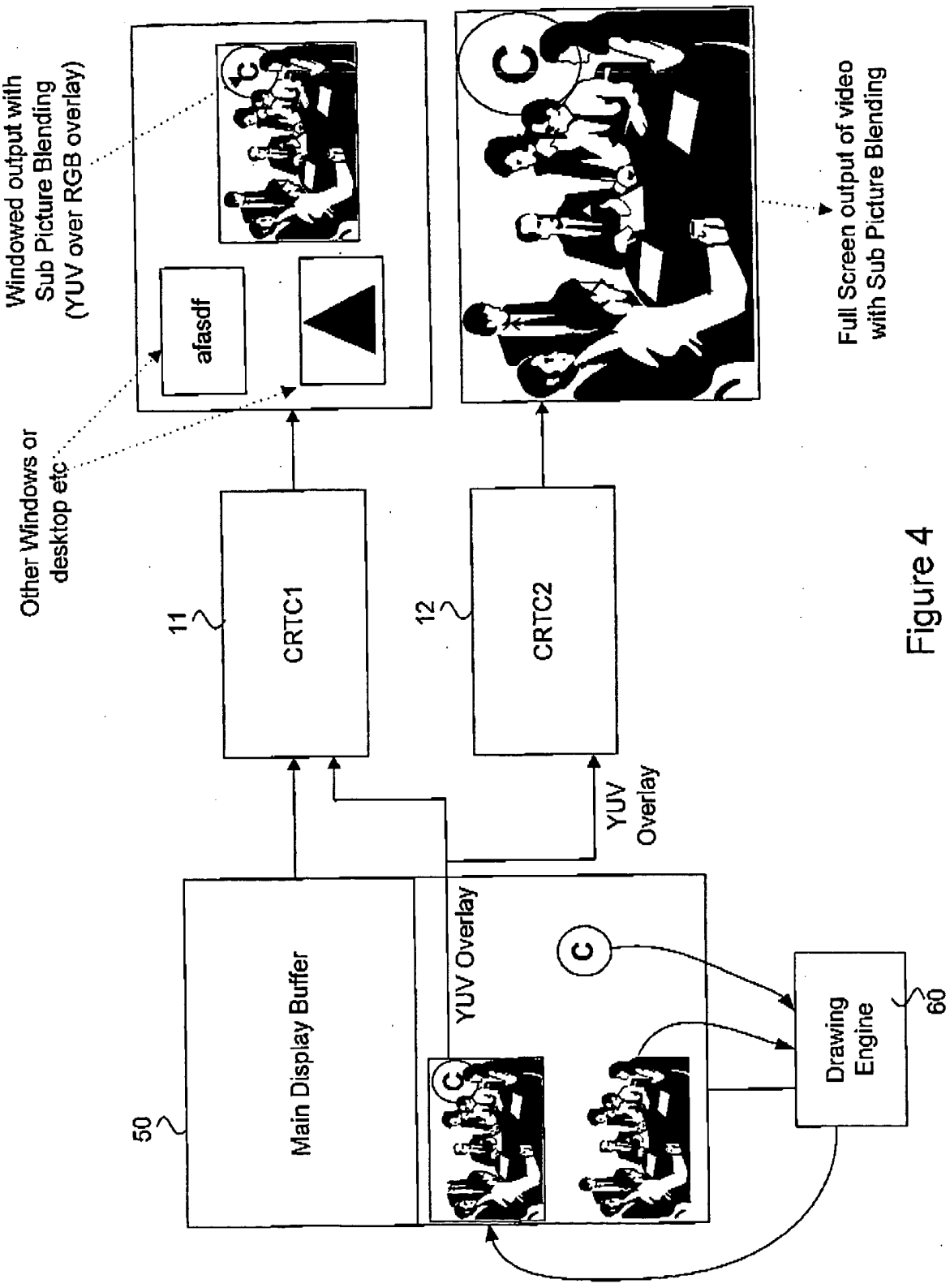


Figure 4

APPENDIX F

Proposed Amendment

Page 8, line 18:

In the embodiment of Figure 4, the YUV surface is processed by the drawing engine 60 in order to blend using the 3D drawing engine capability within the display controller apparatus to create a blended YUV surface. This blended surface is like the one which could also be achieved using a blending unit, namely the logo is blended with the source video surface to generate the YUV overlay surface which is then read for display by CRTC2 in full screen output and separately read by CRTC1 for display within a window in the desktop. The output of CRTC1 11 includes a window containing a YUV video with sub-picture blending overlaid over the RGB desktop.

APPENDIX G

Modified Figure 8A from Ranganathan illustrating "additional logic"

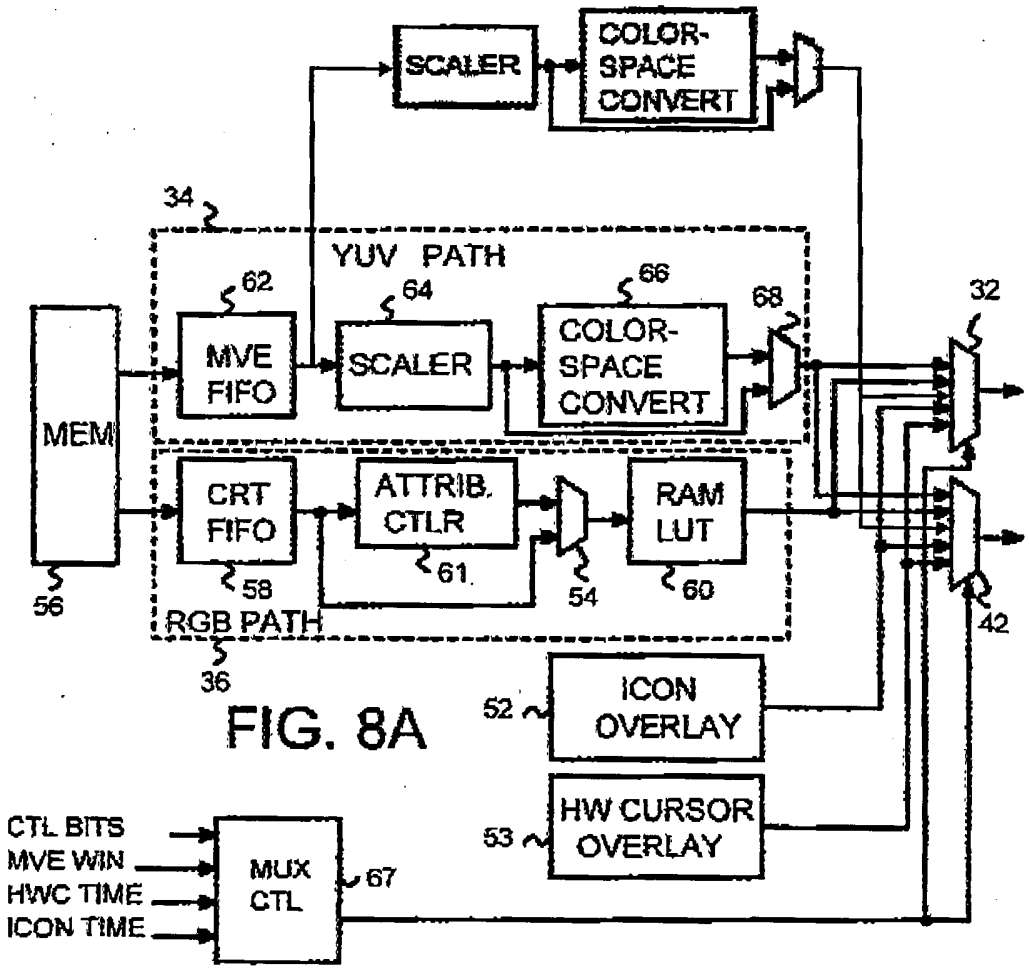


FIG. 8A